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(54) Title: PROCESS FOR THE PRODUCTION OF OLEFINS

(57) Abstract: A process for the production of olefins from a hydrocarbon comprising the steps of: a) passing a first feed stream comprising gaseous reactants to a first reaction zone wherein said gaseous reactants react exothermically to provide a product stream b) producing a mixed feed stream comprising oxygen by passing the product stream produced in step (a) and a second feed stream comprising a hydrocarbon feedstock to a mixing zone, oxygen being passed to the mixing zone via (i) the product stream produced in step (a), (ii) the second feed stream comprising a hydrocarbon feedstock and/or (iii) a third stream comprising an oxygen-containing gas c) passing the mixed feed stream directly to an essentially adiabatic second reaction zone wherein in the absence of a supported platinum group metal catalyst at least a part of the oxygen is consumed and a stream comprising olefins is produced e) cooling the stream comprising olefins exiting the second reaction zone to less than 650°C within less than 150 milliseconds of formation and wherein the temperature of the mixed stream is at least 500°C, the mixing zone and the second reaction zone are maintained at a pressure of between 1.5-50 bar and the residence time within the mixing zone is less than the autoignition delay for the mixed stream.